

### REMARKS

The amendments to claims 8 and 12-14 address the objections and rejection under 35 USC §112, second paragraph. The amendments made to these claims do not change their scope.

#### Rejections Under 35 USC §102 and §103

The pending claims now define a catalyst comprising a matrix, a group VIIB metal, a non-noble group VIII metal, molybdenum or tungsten, optionally an element from group VIIA, and an element selected from phosphorous, boron and silicon deposited on the matrix.

#### Kittrell

Kittrell (US 3,617,485) discloses a catalyst which does not contain molybdenum or tungsten as required in the catalysts of new claim 22 and all the claims which depend thereon. The group VI metals used in the methods of Kittrell appear in a second catalyst, (see col. 4, lines 53-55). In addition, there is no indication that an element selected from phosphorous, boron and silicon is deposited on the support used. Therefore, the teachings of Kittrell do not anticipate the catalysts of claims 2-6, 8,9,15,16 and 22 or the processes which use these catalysts defined in claims 10-14,18,19 and 21.

One skilled in the art would not be motivated to modify the catalysts of Kittrell to incorporate group VI metals therein since such a modification is inconsistent with its teachings. In addition, there is no suggestion within the reference which would direct or motivate one skilled in the art to incorporate phosphorous, boron or silicon onto the support (matrix). In the absence of such a suggestion, Applicants submit there is no basis for the rejections under 35 USC §103 which rely on this reference.

#### Antos et al.

Antos et al., (US 4,463,104), discloses a catalyst comprising a platinum group component, a phosphorous component and a porous support. It is said the catalyst may also comprise additional metals selected from a wide variety, (see col. 4, lines 20-27). However, there is no direction to prepare or employ a catalyst with the components required of those claimed herein from the numerous combinations that can be obtained from this list. This broad

generic language does not describe or disclose to one skilled in the art a catalyst comprising a Group VIIB metal, non-noble metal of Group VIII, molybdenum or tungsten, optionally an element of Group VIIA, and an element selected from phosphorous, boron and silicon. Therefore, this reference does not anticipate any claims herein.

It also would not be obvious to obtain the catalysts claimed herein from the numerous combinations of metals that are possible from list provided by Antos et al. at col. 4, lines 20-21. Antos et al. do not indicate which combinations of metals can be used and provides no direction to require either molybdenum or tungsten. In addition, Antos et al. indicates these metals can modify the activity of a platinum catalyst, a group VIII noble metal. There is no suggestion these metals will support catalytic activity on their own, i.e., in the absence of a platinum catalyst. Therefore, the catalysts and methods claimed herein are unobvious over Antos et al.

#### EP 573,973

This reference discloses a catalyst comprising molybdenum, cobalt or nickel and rhenium on a substrate of alumina which has boron comulled there with, i.e. dispersed within the matrix. Boron (or another element selected from phosphorous and silicon) is not deposited on the support used. Therefore, this reference does not anticipate any claims herein. Embodiments of this invention which contain Group VIIA elements are further distinguished from EP 573,973.

There is teaching within EP 573,973 which directs or motivates one skilled in the art to modify the structure of the catalysts disclosed in a manner which would result in the deposition of boron (or silicon/ phosphorous) on the surface of the alumina instead of dispersing the boron in the support.

#### GB 2066690

This reference discloses a catalyst comprising nickel, alumina, rhenium, and eventually chromium. Boron is introduced by coprecipitation, i.e., it is dispersed in the matrix, and not deposited on the matrix. Therefore, this reference does not anticipate any claims herein. It is acknowledged in the office action that this reference does not disclose the use of Group VIIA metals. Therefore, embodiments which contain Group VIIA elements are further distinguished

from this reference.

There is no hint or suggestion in the teachings of GB 2066690 to substitute the technique of coprecipitating boron and the matrix material with depositing boron on the surface of the matrix material such that the claims herein are unobvious in view of this reference.

Combined teachings of EP 573,973 and Heck (US 4,430,198)

Original claims 1-8, now claims 22, 2-6 and 8, are rejected under 35 USC §103 based on EP 0 573,973 in view of Heck et al., (US 4,430,198). Heck adds nothing to the teachings of EP 0 573,973 to suggest depositing the boron used in the catalysts of EP 0 573,973 ( or phosphorous or silicon) on the surface of the substrate. Therefore the combined teachings of these references do not render the claims herein obvious.

In addition, applicants submit the catalyst components and intended uses disclosed by each of these references are so distinct that one skilled in the art would not even be motivated to modify the catalyst of EP 0 573,973 to incorporate a Group VIIA element such as fluorine. Therefore, the embodiments of this invention which contain Group VIIA metals are even further removed from these combined teachings.

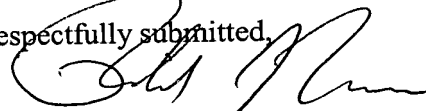
Declaration

A declaration under 35 USC § 132 by Germain Martino is submitted herewith for consideration. This declaration provides data comparing the performance of catalysts in a hydrodesulphuration test. Of the catalysts tested, some were impregnated with an element selected from boron, phosphorous and silicon and some were not.

Based on the above remarks, Applicants submit that all pending claims are in a form suitable for allowance and patentable over the cited references. Therefore, withdrawal of the rejections and allowance of these claims are earnestly solicited.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,



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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS:**

Please replace claim 1 with new claim 22 as follows:

--22. A catalyst comprising:  
at least one matrix,  
at least one group VIIB metal,  
at least one non-noble group VIII metal,  
at least one group VI metal selected from the group consisting of molybdenum and tungsten,  
optionally at least one element from group VIIA, and  
at least one element deposited on the matrix selected from the group consisting of phosphorus, boron and silicon.--

Please amend claims 2-6, 8, 12, 13, 14, and 17 as indicated below.

2. (Amended) A catalyst according to claim 1 22 in which the group VIIB element is rhenium or manganese.

3. (Amended) A catalyst according to claim 1 22 in which the group VIIB element is rhenium.

4. (Amended) A catalyst according to claim 1 22 in which the group VIIB element is cobalt or nickel.

5. (Amended) A catalyst according to claim 1 22 in which the matrix is selected from the group consisting of ~~formed by~~ alumina, silica, silica-alumina, clay, magnesia, titanium oxide, zirconium oxide, boron oxide, and aluminates.

6. (Amended) A catalyst according to claim 1 22 in which said matrix is alumina.

8. (Amended) A catalyst according to claim 1 22, in which said group VIIA element is fluorine.

9. (Amended) A catalyst according to claim 1 22 comprising, in weight % with respect to the total catalyst mass:

- 0.01% to 50% of at least one group VIIB element;
- 0.01% to 99.7% of at least one matrix;
- 0.01% to 50% of at least one hydro-dehydrogenating metal;
- 0.01 to 20% of an element selected from P, B, and Si;
- 0 up to 15% of at least one group VIIA element.

10. (Amended) A process for ~~the~~ hydrotreating of a hydrocarbon ~~feed feeds~~, comprising contacting a hydrocarbon feed with a catalyst according to claim 1 22.

12. (Amended) A process according to claim 10, in which the hydrocarbon feed is selected from the group consisting of ~~formed by~~ gasolines, gas oils, vacuum gas oils, residues which may or may not be deasphalted, paraffin oils, waxes and paraffins and said hydrocarbon feed it may optionally contain at least one ~~heteroatoms~~ heteroatom such as sulphur, oxygen or nitrogen and at least one metal.

13. (Amended) A process according to claim 10 performed prior to ~~for hydrotreating hydrocarbon feeds prior to their treatment in~~ hydrocracking the hydrocarbon feed.

14. (Amended) A process according to claim 1 10 wherein the catalyst has been sulphurised.

17. (Twice Amended) A catalyst according to claim ~~16~~ 15 in which the group VIIA element is fluorine.